



# PROGRESS OF THE CALIFORNIA SCIENCE PROJECT



## CALIFORNIA POSTSECONDARY EDUCATION COMMISSION

JUNE 1992

COMMISSION REPORT 92-15

## Summary

The California Science Project is the third of seven discipline-oriented staff development programs for the State's public schools that the State currently funds. This statewide Science Project has resulted in the establishment of nine regional projects, each of which involves a group of higher education and K-12 institutions, school districts, and county offices of education. Most of these projects are approaching their third year of operation.

The statute that initiated the Project (Chapter 1486, Statutes of 1987) directed the Commission to submit a progress report after three years of operation of the statewide Project and a subsequent evaluation after its fifth year. This report by the staff of the Commission responds to the first of these two responsibilities.

On page 11 of the report, the staff states "All the evidence available to the Commission staff for this progress report suggests that the California Science Project is making satisfactory progress at this point. It enjoys the significant benefit of operating in an environment of Statewide and national consensus about science education reform." In addition, Commission staff reports that the Project is successfully promoting the collaborative model of staff development that has been modeled so effectively by the California Writing Project and the California Mathematics Projects. That strategy of developing teachers-to-teach-teachers continues to make good use of the State's limited staff development funds by training the Project's participants to become staff development leaders in their districts.

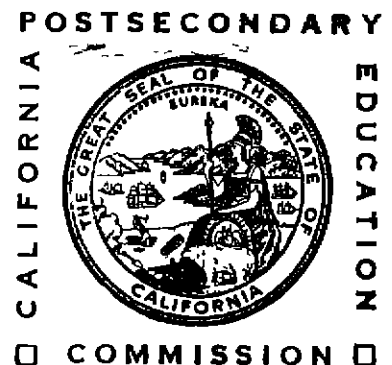
The staff recommends that the Project pay increased attention to two issues: (1) ensuring ongoing administrative support for the objectives of the Project at both the school and district levels, and (2) ensuring improvements in the assessment of students' science learning.

The Commission discussed this report at its meeting of June 1, 1992. Additional copies of the report may be obtained from the Publications Office of the Commission at (916) 324-4992.

# PROGRESS OF THE CALIFORNIA SCIENCE PROJECT

*A Report to the Legislature in Response  
to Chapter 1486, Statutes of 1987*

**CALIFORNIA POSTSECONDARY EDUCATION COMMISSION**  
1303 J Street • Fifth Floor • Sacramento, California 95814-2938





**COMMISSION REPORT 92-15**  
**PUBLISHED JUNE 1992**

**Contributing Staff: William K. Haldeman.**

This report, like other publications of the California Postsecondary Education Commission, is not copyrighted. It may be reproduced in the public interest, but proper attribution to Report 92-15 of the California Postsecondary Education Commission is requested.

## *Contents*

Origins of the Report	1
Content of the Report	1
Scope of the California Science Project	1
Context of the Project	3
Goals of the Project	5
Progress of the Regional Projects in Meeting Statewide Project Goals	5
Preparations for Evaluating the Program's Effectiveness	10
Conclusions	12
References	12
Appendix: Chapter 1486, Statutes of 1987	15

# *Displays*

1. Members, Advisory Committee, California Science Project **2**
  
2. Budget of the California Science Project, Fiscal Years 1989-90  
Through 1991-92 **2**
  
3. Current Regional Projects of the California Science Project, Fiscal  
Year 1991-92 **4**
  
4. Total Number and Percent of Participants in the Regional Projects of  
the California Science Project by Race/Ethnicity, 1990 and 1991,  
Together with Percentage of Underrepresented Racial/Ethnic Groups **6**

# Progress of the California Science Project

## Origins of the report

Chapter 1486 of the Statutes of 1987 (enacted as Senate Bill 1601, Garamendi) established the California Science Project and directed the California Postsecondary Education Commission to prepare two reports on it for the Governor, Legislature, and Superintendent of Public Instruction

- (a) A summary of the local project evaluations and an assessment of the extent of program implementation and progress toward achieving project goals. The summary shall be submitted on or before January 1, 1989
- (b) An evaluation of the project's effectiveness and recommendations for legislative action regarding the project. The evaluation shall be submitted on or before January 1, 1991

Because full funding for the Science Project did not begin until 1989-90, the Commission recommended to Senator Garamendi that the original schedule for completing these reports be set back to 1992 and 1994. This 1992 report therefore responds to the first of the two tasks specified above

## Content of the report

In this report, the Commission staff presents an overview of the California Science Project, summarizes the evaluations of its nine separate regional projects, and assesses the implementation of, and progress toward achieving, its goals. To provide a basis for this assessment, the Commission has derived a set of Project goals from a content analysis of the statute and major Project documents, and it has used this list as a guideline for comparing the accomplishments of the nine regional projects.

The Commission staff does not intend this report to be an evaluation of the California Science Project, at least in the sense of offering conclusions about its effectiveness and efficiency. Instead, in this report the Commission identifies the types of data that the Project needs to collect from its local sites so that

the needed information will be available for later evaluation -- first by Inverness Research Associates, who are evaluating the Project and California's other major subject matter projects for a report due to be published in 1993, and then by the Commission during 1993-94 in the second and last phase of its assignment under this statute

## Scope of the California Science Project

The California Science Project is a statewide professional development program for teachers of science from kindergarten through community college that the Legislature modeled on the successful practices of the California Writing Project and the California Mathematics Project

The statute creating the project (which is reproduced in Appendix A to this report) called for a broadly representative Advisory Committee to "recommend proposals to be funded and criteria for project evaluation" and charged the committee with evaluating the progress of the Project and recommending appropriate changes in it. (Members of the Advisory Committee are listed in Display 1 on page 2.) Due to the limited amount of State funds available for the Project, the committee decided to concentrate the first efforts of the Project toward the lower end of the K-14 spectrum, and thus during the first two years it has funded regional projects designed to serve for the most part teachers from kindergarten through the sixth grade.

In the first year of funding (fiscal 1988-89), the Advisory Committee conducted regional forums and reviews of other science education projects in the State to identify existing programs with which the new Project should collaborate and to determine the needs it should serve. During the next year (fiscal 1989-90) it funded the first eight regional projects, which conducted their summer institutes during the summer of 1990. Since then, it has funded two more years of work. Display 2, at the bottom of page 2, shows this history of funding.

**DISPLAY 1    *Members, Advisory Committee, California Science Project***

Philip Dowling, Biological and Health Science Department, Diablo Valley College  
Michael Halloran, External Affairs, University of Southern California, *Chair*  
Walter (Don) Hubbard, Department of Physics, Berkeley High School  
Garland Johnson, President, National Science Supervisors Association, Fresno  
Gayland Jordan, Science/Environmental Education Unit, California Department of Education  
Richard Komastu, Eisenhower Math/Science Project, California Postsecondary Education Commission  
Geraldine Lamar, Science Teacher, E O Green School, Oxnard, California  
Ronald S Lemos, Academic Affairs, Plans, and Programs, The California State University  
William Malet, Investment Management Administration, Pacific Telesis, San Francisco  
Melvin Moore, Science Teacher, Lincoln High School San Diego  
Carol Neistein, Science Teacher, Yorba Linda Middle School, Yorba Linda  
Mark Ortiz, Science Teacher, Kings Canyon Middle School, Fresno  
Roland Otto, Lawrence Berkeley Laboratory, University of California, Berkeley  
Kim Perry, Chancellor's Office, California Community Colleges, Sacramento  
Diane Schwartz, Computer Science Department, California State University, Northridge  
Ellen Switkes, Academic Personnel, Office of the President, University of California  
Robert Wild, Professor *Emeritus*, Riverside

Source    Executive Director, California Science Project

**DISPLAY 2    *Budget of the California Science Project, Fiscal Years 1989-90 Through 1991-92***

Income	Fiscal Year		
	<u>1989-90</u>	<u>1990-91</u>	<u>1991-92</u>
University of California Intersegmental	\$294,820	\$295,292	\$295,292
California Department of Education, 1882	900,000	900,000	900,000
Carryover	<u>198,081</u>	<u>183,694</u>	<u>257,986</u>
Total Income	1,392,901	1,378,985	1,353,278
<b>Expenditures</b>			
Administration	\$167,244	\$181,000	\$210,000
Programs			
Forums	89,925	0	0
Sites	895,000	1,040,000	1,040,000
Other	57,138	0	0
Total Expended	1,209,207	1,221,000	1,250,000
To Carry Over	183,694	157,986	103,278
<b>Additional Resources</b>			
1990-91 One-time SB 1882 Augmentation		\$85,000	
1991-92 Eisenhower State Initiatives (Visiting Educators and Conference)			\$200,000

Source    Adapted from material from Academic Advancement, Office of the President, University of California.



Eleven regional projects have been established thus far. After the original eight, three new ones were funded the second year, while two of the first year's projects were discontinued. Thus nine regional projects are currently in operation. They are distributed throughout the State in both urban and rural areas. Display 3 on the opposite page lists these current projects; their official sponsors, and their level of funding for fiscal 1990-91.

Typically, the nine regional projects sponsor summer institutes of two to four weeks in length, with several day-long follow-up sessions during the following school year. They place emphasis on the teacher participants in the summer institutes serving as leaders in staff development at their district and school sites following their summer institute experience.

The statewide Project is administered by an executive director whose office is located in the central administrative offices of the University of California. Elizabeth Stage, the current executive director, recently accepted a position with the National Academy of Sciences in Washington, D.C., which requires her to divide her time between her work with the Academy (85 percent) and the Project (15 percent). To assist in the Project's administrative tasks, the University of California has hired two interim co-executive directors who are also regional project directors -- Pamela Castori of the Sacramento Area Science Project, and Tom Ostwald of the South Coast Science Project. They are spending approximately 75 and 50 percent of their time, respectively, attending to the administration of the statewide Project and the remainder of their time at their individual projects.

### Context of the Project

The work of the California Science Project can most easily be understood in terms of national and State efforts at school curriculum reform, science education reform, and subject-matter development.

### Curriculum reform

Since the National Commission on Excellence in Education issued its report, *A Nation at Risk*, in 1983, the nation has witnessed a concerted effort to revise and strengthen the elementary and second-

ary school curriculum. Science is only one of several sections of the curriculum to receive such attention. Thus, the present Project is first of all a product of the growing national consensus on the matter of educational reform.

### Science education reform

In 1989, the American Association for the Advancement of Science published *Science for All Americans*, which provided the general pedagogical approach to science education that California's State Board of Education adopted in the State's "Science Framework" of 1990. In large measure, the California Science Project has derived its guidelines and philosophic underpinnings from that Science Framework. The materials of the Science Project often refer to several of the ten "main ideas" contained in the framework -- among them, the six ideas most closely associated with teacher development:

- The major themes underlying science, such as energy, evolution, patterns of change, scale and structure, stability, and systems and interactions, are developed and deepened through a thematic approach.
- The three basic scientific fields of study -- physical, earth, and life sciences -- are addressed, ideally each year, and the connections among them are developed.
- Science is presented in connection with students' experiences and interests, frequently using hands-on experiences that are integral to the instructional sequence.
- Students are given opportunities to construct the important ideas of science, which are then developed in depth, through inquiry and investigation.
- Instructional strategies and materials allow several levels and pathways of access so that all students can experience both challenge and success.
- Assessment programs are aligned with the instructional program in both content and format; student performance and investigation play as central role in assessment as they do in instruction (Science Curriculum Framework and Criteria Committee, 1990, pp. 8-9).

### Subject matter development projects

The California Science Project is the third in a ser-

**DISPLAY 3    *Current Regional Projects of the California Science Project, Fiscal Year 1991-92***

<u>Project</u>	<u>Sponsoring Entity</u>	<u>Fiscal Year 1990-91 Budget</u>
<b>Bay Area Science Project</b>		
Lawrence Hall of Science, University of California, Berkeley		\$115,000
<b>California Science Project of Inland Northern California</b>		\$110,000
California State University, Chico, Butte College, Shasta College, and Siskiyou County Office of Education		
<b>Central Valley Science Project</b>		\$105,000
California State University, Fresno, Fresno Pacific College; University of California Agricultural Extension, Fresno County, Kings County, and Tulare County Offices of Education, Clovis, Fresno, and Madera Unified School Districts, and the Merced County Superintendent of Schools		
<b>The Inland Area Science Project</b>		\$115,000
University of California, Riverside, California State University, San Bernardino, University of California Extension, and the Office of San Bernardino County Superintendent of Schools		
<b>Orange County Science Education Network (OCSEN)</b>		\$115,000
University of California, Irvine		
<b>Sacramento Area Science Project</b>		\$115,000
University of California, Davis; California State University, Sacramento, American River College, Sierra College, and Elk Grove, Grant Joint, Rio Linda, Sacramento City, San Juan, and Washington Unified School Districts		
<b>South Coast Science Project</b>		\$110,000
University of California, Santa Barbara		
<b>The UCLA Science Project</b>		\$115,000
University of California, Los Angeles Center for Academic Interinstitutional Programs		
<b>USC/LAUSD California Science Project</b>		\$115,000
University of Southern California, Los Angeles Unified School District		

Source: Regional project reports and Executive Director, California Science Project

ies of seven subject-matter projects that California has adopted as one of its school reform strategies. These projects are discipline-oriented staff development programs funded by the State and dedicated to the reform and improvement of K-12 education. They include:

- The California Writing Project;
- The California Mathematics Project,
- The California Science Project;
- The California Arts Project;
- The California History-Social Science Project,
- The California Foreign Languages Project, and
- The California Literature Project

All of these statewide subject-matter projects are administratively headquartered in the Academic Advancement unit of the University of California's systemwide offices in Oakland. They are funded largely through Proposition 98 monies for which the Alameda County Office of Schools currently serves as fiscal agent. Overall policy guidance for them is provided by a Concurrence Committee consisting of representatives of the University of California, the California State University, and the California Department of Education. Serving in an advisory capacity on the Concurrence Committee are representatives of the Alameda County Office of Schools, the Chancellor's Office of the California

Community Colleges' Chancellor's Office, the Association of Independent California Colleges and Universities, and the California Postsecondary Education Commission

According to Mark St. John of Inverness Research Associates, which, as noted earlier, is undertaking an independent evaluation of all of them, their "key characteristics" are "reform-oriented, subject matter centered, teacher-centered, collegial, and long-term" (1992)

### Goals of the Project

In the statute creating the California Science Project, the Legislature incorporated a set of implied goals for the Project in the list of criteria to be used by the Project's Advisory Committee for approving regional projects. Combining these criteria with other goals stated in the Science Framework, the Advisory Committee has given special attention to achieving the following five results:

*Goal I Diverse Population.* Developing instructional strategies and materials that enable all students to achieve their potential, including those students who have been underrepresented in science in the past -- African Americans, Latinos, Native Americans, and females from all racial/ethnic backgrounds.

*Goal II Curriculum Reform* Implementing the tenets of the current science education reform efforts, especially at the K-6 level

*Goal III Science Pedagogy Reform* Expanding the base of scientific knowledge and the repertoire of teaching techniques of the participating teachers

*Goal IV Networking and Collaborating* Building a mutually supportive network of the various science education reform and staff development programs

*Goal V Institutionalizing Science Education Reform* Developing teacher leaders and a supportive administrative environment for the expansion of science education reform

The staff of the Postsecondary Education Commission has used these five statements as the basis for assessing the progress of the State's nine regional

projects in accomplishing the California Science Project's goals. In its assessment, the Commission staff reviewed the progress reports furnished by the regional projects as a requirement of the annual funding process. These progress reports summarize activities of the previous year and contain information from each project's internal evaluation of its summer workshop and follow-up activities. Four regional projects have also undergone external evaluations and have appended the reports of those evaluations to their progress reports.

The Commission staff has also benefited from the work of the Inverness Research Associates in gathering from the individual project sites copies of evaluation surveys and other materials that indicate the type of self-evaluation the projects are conducting

All in all, the Commission staff has found the self-reporting by the regional projects to be entirely adequate for the purposes of this progress report as well as refreshingly candid and interesting.

### Progress of the regional projects in meeting statewide Project goals

#### *Goal I Serving a diverse population*

The Advisory Committee of the Project announced in its first Request for Proposals in 1989 that "the participation of teachers from groups historically underrepresented in science and teachers of students from groups historically underrepresented in science should be especially targeted"

In reviewing the participant data reported by the regional project directors (Display 4, page 6), the executive staff of the statewide Project found that most site projects were operating at or above parity in their effort to reach underrepresented teachers and students. ("Parity" is used here to refer to the proportion of teachers or students from historically underrepresented groups in the population being served by each regional project.) Some site administrators reported a difficulty in meeting both this goal of attracting underrepresented teachers and the Project's interest in attracting school site teams in order to build a "critical mass of support" at the school level. Nonetheless, despite this difficulty, the Project as a whole has been successful in reach-

**DISPLAY 4** *Total Number of Teachers and Percent of Underrepresented Teachers and Students Served in the Regional Projects of the California Science Project, 1990 and 1991*

Regional Project	Year	Total Number of Teachers	Percent of Teachers Who Are Underrepresented		Percent of Students Who Are Underrepresented	
			Actual	Pool	Actual	Pool
Bay Area Science Project	1990	28	25%	12%	36%	32%
	1991	31	13	12	47	32
CSU, Los Angeles	1990	32	18	19	83	63
Central Valley Science Project	1991	34	6	11	43	46
California Science Project of Inland Northern California	1990	35	3	4	14	13
	1991	32	6	4	8	13
The Inland Area Science Project	1990	40	15	11	83	63
	1991	29	17	11	42	40
Orange County Science Education Network (OCSEN)	1990	31	10	6	35	40
	1991	31	0	0	33	30
Redwood Area Science Project	1990	36	6	4	16	15
Sacramento Area Science Project	1991	25	12	10	35	27
South Coast Science Project	1990	29	10	10	38	35
	1991	30	17	10	29	35
The UCLA Science Project	1990	27	26	19	82	63
	1991	68	47	23	86	63
USC/LAUSD California Science Project	1991	52	52	NA	91	63
Total, All Projects	1990	258	15	15	42	
	1991	322	23	14	46	43
All California	1990 and 1991		14		43	

Notes "Underrepresented" teachers and students are African Americans, Latinos, and Native Americans. The difference between "Actual" and "Pool" teachers is the difference between the actual participants and the pool of potential participants in the school districts involved in the regional projects. Students do not participate in the Project directly; instead their "actual" figures represent the proportion of underrepresented students taught by participating teachers, while their "pool" figures represent the pool of underrepresented students in the school districts involved in the regional projects.

Source: Executive Director, California Science Project.

ing either teachers from underrepresented groups or the teachers of underrepresented students.

Where fewer minority teachers were recruited than leaders of the statewide Project had sought -- as at the Orange County site, for example, because there are so few minority science teachers in the county --

regional projects were still able to serve teachers with a large proportion of minority students in their classes. To increase the Project's efforts on ensuring the effectiveness of these teachers in serving their minority students, the Project requested and received the \$200,000 in 1991-92 from California's State Grant Program of the federal Dwight D. Ei-

senhower Mathematics and Science Education Act noted in Display 2

### *Goal II Reforming the science curriculum*

As noted earlier, the Project employs the 1990 Science Framework adopted by the State Board of Education as a guide in its science curriculum activities. The Science Framework provides a comprehensive and integrated approach to science education reform that covers both the essential topics of science education -- i.e., the nature and content of science -- and the teaching processes that appropriately model the methods and skills of scientific inquiry.

In harmony with the Science Framework, the Project emphasizes the six major themes of science -- energy, evolution, patterns of change, scale and structure, stability, and systems and interactions -- as well as integrative lessons that are not bound by the traditional disciplinary categories in teaching the skills of scientific inquiry. Part of the time in many, if not all, of the regional summer workshops is devoted to tasks associated with the work of the California Science Implementation Network, i.e., the development of curriculum matrices that are meant to guide the instructional planning for science education at the school and district levels. The interdisciplinary themes and the curriculum matrices are, in part, a means for enabling teachers to teach these integrative lessons.

The California Science Project of Inland Northern California reported that modeling the interdisciplinary approach to science is difficult, since the presenters tend to stay tied to their single disciplines. A number of projects use interdisciplinary themes to help reinforce the interdisciplinary approach -- for example, "Urban Ecology" in the UCLA project and "Our Changing Valley" in the Central Valley project.

Some of the regional projects have moved to the next level of interdisciplinary collaboration by holding joint meetings with representatives of the California Writing and Mathematics Projects and with early childhood education teachers

### *Goal III Reforming the way science is taught*

"Refrain from giving the answers and the ex-

citement will keep on burning" -- participant in the Sacramento Area Science Project

The central reform embodied in the teaching/learning process promoted through the California Science Project is the change from teaching students the facts of science to empowering them to participate in the processes of discovering knowledge. In the language of the Project's Advisory Committee, the student becomes an active learner, the teacher facilitates students' achieving their own goals, and the activities in class are used to challenge them to think and to "construct" meaning -- hence the origin of the term, "constructivist learning." Without question, constructivist teaching is the teaching style promoted by the Advisory Committee and the State Board of Education's Science Framework.

As far as the Commission can determine from its examination of the progress reports of the individual projects, most all of the nine projects incorporate the constructivist approach to teaching at least to some degree. Most of them appear to model and then incorporate this approach into the various activities of the workshops themselves, although in some projects there appears to be more talking about the approach than demonstrating or modeling it.

On the whole, the constructivist approach is strongly supported by the teachers participating in the regional projects, many of whom find the new method liberating. The following comments from two teachers in the Sacramento Area Science Project are typical of the vast majority:

Constructivism is like playing detective: Observe the situation, ask questions, manipulate the situation a bit and draw conclusions.

One of the things I like about your constructivism is that children formulate their own questions for discovery. They would therefore be investigating at a level that is developmentally appropriate for them -- thus making learning more interesting and successful.

A small minority of the participants, however, have problems with this pedagogical approach. For example, one Sacramento Area project participant made this comment:

The most outstanding aspect of the constructivism presented here was that no direct answers were given. I have a certain amount of problems with this. In all probability there will be those students that respond to the challenge of having to discover the answer for themselves. However, one of the big objectives of successful teaching is to keep the students from becoming frustrated. For those students that request an answer, I cannot understand the value of not telling them.

Although dedicated to the task of promoting constructivism, project leaders have difficulty in having participants consistently model this approach. For example, the UCLA project announced:

All strategies promoted by the UCLA Science Project encourage students to be active in the learning process and put the teacher in a facilitating role. In our programs, we model this for teachers by expecting teacher participants to become active leaders and project leaders to take a facilitating role.

But in the evaluation of the UCLA project's summer workshop, eight teachers criticized presenters for lecturing too much. And at the conclusion of another project's summer institute, one participant wrote, "Presentations tended to be speeches. No graphic presentations or hands-on activities."

Other instructional approaches and techniques promoted through the statewide Project and various regional projects also involve an inclusive teaching method in which students with different learning styles and abilities can participate. "cooperative learning," involving whole class and small group strategies to give students the sense of inclusion and acceptance by their peers. Working directly with the materials of investigation -- called "hands-on" instruction -- not only helps to promote the scientific thinking processes connected with constructivist learning but also enables students who are not proficient in English to participate on an equal basis with those more adept at the language.

#### *Goal IV Networking and collaborating in support of science education reform*

Teaching science in the isolation of a self-contained classroom can be a daunting experience, especially

for elementary school teachers. Few are well-prepared in science, and the isolation of the classroom tends to separate them from the community resources and colleagues that could enrich their teaching. The Project's emphasis on elementary school science has made it important that a corollary goal of the project be to provide teachers an opportunity to exchange instructional strategies, share diverse points of view about science education, and collaborate with other science reform initiatives.

By all reports, this aspect of the Project is one of the most successful. While the value of the terms "networking" and "collaboration" may suffer from overuse, the apparent effect of networking activities is invigorating for teachers who have felt the stultifying effects of classroom isolation. Julian Weissglass, principal investigator of the South Coast Science Project, notes the obstacles to educational reform that are generated by the working conditions of teachers in his paper, "Teachers Have Feelings: What Can We Do About It?"

The Project seems to deal effectively with this problem on numerous levels and in numerous ways: peer instruction (teachers teaching teachers), the school site and district team, the on-going network created by the bonding between and among workshop participants in a region, and the collaboration with community resource people, to name a few. In this regard, the University of Southern California/Los Angeles Unified School District project reports of its participants:

All saw collaboration as an advantage, citing such positive aspects as sharing of ideas, information, and workload; better collective use of individual talents, efficient use of time and money; improved implementation of short and long term goals; and personal validation.

A participant in the Central Valley Science Project commented, "I didn't realize how much support is available to teachers of science education in the Central Valley."

A participant in the Sacramento Area Science Project stated, "The network of support from these wonderful teachers within this project will carry me through times when the LEP [limited-English-proficient] population within my classroom increases

in the future I know they will be there for me to answer any questions or concerns I may have "

And the South Coast Science Project reports that when it has asked its summer workshop participants, "Overall, what were the best aspects of the institute for you?" . the most frequently cited benefit, in both years, is the collegiality and the resultant motivation gained from interaction with enthusiastic colleagues. Since these responses were open-ended, the fact that over 80 percent of the teachers highlighted this feature indicates the powerful influence of teacher interchange "

#### *Goal V: Institutionalizing the Project*

The California Science Project joins other science education reform efforts in marshalling its resources for long-term change in science education. While the Project is first and foremost a professional development program for teachers, its leaders realize that teachers must have the on-going support of their administrators and district officials in order to carry out the desired changes. The Project's Advisory Committee has been explicit in its search for strategies that will support continuing reform in the classrooms of the public schools. Even in the best of times this goal would be a challenging one, but the State's current resource exigencies require even more diligence in making each reform effort a pervasive and lasting one

The nine site projects report a variety of program approaches for encouraging on-going reform, including school site teams, district teams, the recruitment of teacher-leaders, regional networks, and follow-up meetings of project participants

*1 School site teams:* The regional projects invite teams from each school -- for example, the principal and two teachers from different grade levels -- to participate in the summer workshops in order to develop a critical mass of expertise at the school for continuing staff and curriculum development. The commitment, if not the actual involvement, of the school administrator is critical to the continuing success of the reform effort. Nonetheless, the projects report difficulty in recruiting full teams: one of them indicates a problem in maintaining the involvement of school principals over the two-week period of its summer workshop, and one central valley project states that it has chosen to select district

teams rather than school site teams in order to spread opportunities across the large geographic area it serves.

*2. District teams.* The Orange County Science Education Project has recruited district-wide intersegmental teams including undergraduate college members in order for the "supportive network" for continuing reform to become a district entity rather than only a school site entity. Indeed, one geographically large project operates with county-wide teams rather than district teams, although it admits the difficulty in getting teams together has led to the dissolution of one team. Additional evaluation is needed to examine if the school-site or the district-wide foci are equally effective in carrying out long-term reform.

*3. Recruiting teacher-leaders:* Because of the success of the California Writing Project in using teachers to teach teachers, most regional projects of the California Science Project have adopted this strategy. Some, like the Sacramento Area Science Project, emphasize the fact that their primary criterion for selecting teachers is their leadership ability -- and the Sacramento Area project reports that during the Fall 1991 term, the 25 teachers who had participated in its Summer 1991 institute had already reached an estimated 1,500 teachers with in-service training on the State's Science Framework

*4 Regional networks* Two regional projects -- the Bay Area Science Project and the Inland Area Science Project -- mention that a regional network is either a key element in their plans for their long-term effectiveness or a significant outcome of their broad collaboration that will continue to have an on-going positive effect

*5 Follow-up meetings of institute participants* Meetings during the school year immediately following the summer institute provide both an incentive for institute participants to begin implementing the lessons from the previous summer in order to be able to report how the implementation is progressing and a reinforcement of the sense of the larger team developed in the summer institute. All nine projects have adopted this pattern of reinforcement, and it appears to be working quite successfully

Due partly to the existence of a strong national movement in the reform of science teaching, partly to the leadership of the California Department of Education and Superintendent of Public Instruction Honig, and partly to the leadership of the California Science Project, a confluence of activities and networks is creating a positive environment for continuing science education reform.

### *Reforming the ways students are assessed*

The Commission staff believes that reforming how students are assessed should be an objective of equal importance to the goals of the Science Project, although this objective was not directly derived from the content analysis of the Project's authorizing statute or policy documents. One of the goals of California's Science Framework is movement away from factual recall on short-answer or multiple-choice tests and toward use of "multiple forms of assessment" that are "integrated with teaching and often undistinguishable from instruction."

A critical task for the Project is to be an active participant in development of assessment tools that faithfully reflect student development of the skills of scientific inquiry which are at the center of the new curriculum. According to the UCLA Science Project, its teacher participants report that "their students were learning concepts but they perform quite poorly in test situations." Attention must be given to this matter for fundamental pedagogical reasons, i.e., are teachers assessing (or even, do they know how to assess) what they are trying to teach their students? Any disjunction between instructional goals and assessment could ultimately undermine confidence in the reform effort and thus hinder its long-term success.

In a number of the regional projects, the development of student assessment strategies is covered in the development of teaching units. In others, the on-going evaluation of the participants' learning in the summer workshops is itself a conscious modeling of "authentic assessment" techniques in which "virtually all the evaluative activities take place within the context of the direct experiences of the teachers" and are not administered at a time removed from what they are engaged in. These evaluative activities include participants' journals, daily assessment sheets, a research assistant's log, lesson development team debriefings, a teacher research group (composed of project participants who

keep a log of the activities in their classroom to bring back to the regional project), and presentation forms that provide for immediate feedback to presenters.

The linking of the constructivist instructional approach with multiple forms of "authentic assessment" is a potentially powerful combination of teaching and student evaluation techniques and careful attention to both elements of this combination is absolutely necessary if the reform of science education is to succeed.

The Project's founding legislation omitted any direct reference to student assessment and the Project's administration and advisory committee have been less than explicit about its priority. For example, project sites were not asked to discuss their attention to this objective in their 1991 progress reports and while most project reports cover this matter quite thoroughly, several projects appear to be paying only slight attention to the role of assessment. Three of them make virtually no reference to work on this particular objective. Because this combination of teaching and assessment techniques intertwines with instruction and student evaluation to the point that they become almost undistinguishable, it is difficult to determine from the brief progress reports of those projects the degree to which they are overlooking this objective. It should be noted, however, that the Project co-directors have been attentive to and involved in Statewide assessment and development activities.

### **Preparations for evaluating the program's effectiveness**

The Commission's evaluation of the effectiveness of the California Science Project is now due to be submitted "on or before" January 1, 1994. Some early preparations for this evaluation are essential in order to ensure that the required data are available for that assessment. The Project's Advisory Committee is directed by statute to develop appropriate measures of effectiveness, but it is only beginning to consider this task.

As the Commission staff sees it, the task is two-fold, involving the development first of criteria and then of baseline data.

### *Development of criteria*

The Legislature has listed these five areas in which



criteria are required:

- (a) The change in science knowledge and pedagogical techniques for teaching science of participating teachers served by the local project
- (b) Participants' attitudes towards the effectiveness of the local project.
- (c) Changes in classroom behavior and perceived in-class teaching effectiveness
- (d) Participants' contributions to on-going teacher retraining and in-service programs
- (e) Change in the students' knowledge of science due to their teacher's participation in the science project (Section 52962)

Members of the Project's Advisory Committee have pointed out the difficulties inherent in attributing changes in science education to any one science reform program. At the present time, they note, there are at least a half dozen major programs in the State that have similar goals, and a number of these may be operating in the same school district at the same time. Of the estimated 110,000 science teachers in the State, through both direct and indirect means, the California Science Project may reach only about 5,000 in a given year.

The Commission staff acknowledges this problem, but it believes that although the reasons for differential knowledge gains in students may be difficult to isolate, the effort must still be made. As noted above, there is still much work to be done in developing and implementing appropriate student assessment processes to measure the effectiveness of the "new science" curriculum.

#### *Development of baseline data*

The Commission staff offers the following seven evaluative questions as appropriate, given the statute creating the California Science Project. Most of the seven reflect expectations or goals that can best be assessed by having some basis of comparison with conditions prior to, or early in the life of, the Project. The Commission staff strongly recommends that the Project's Advisory Committee and executive staff give careful attention to the development of baseline data for determining whether these regional projects, as a group, provide a comprehensive approach to solving the problems identified by the Legislature:

- Is the effect of the projects, as a group, an increase in the number and quality of persons "having a solid foundation in science?"
- Is the effect of the projects, as a group, an increase in the number of high school juniors and seniors that take a course in science?
- Is the effect of the projects, as a group, an increase in the number of teachers trained in science among those teachers already employed in the public schools?
- Is the effect of the projects, as a group, the provision of exemplary programs for upgrading and training science teachers?
- Is the effect of the projects, as a group, an advancing of the achievement in science among those groups generally underrepresented in science courses and majors?
- Is the effect of the projects, as a group, the increase in the number of cooperatively planned and funded in-service training programs in science?
- Is the effect of the projects to "define more clearly those standards of science knowledge required at each school level" following the models of the National Science Foundation, the National Association of Science Teachers, the California Writing Project, the California Mathematics Project, the EQUALS Project, the MESA Project, the University of California at Irvine's Summer Science Institute, the Lawrence Hall of Science's Programs for Schools, and the Lawrence Livermore Laboratory's Science Education Center, Summer Science Institute, and Lesson In-Service Science Workshop for Elementary and Middle School Teachers?

#### **Conclusions**

All the evidence available to the Commission staff for this progress report suggests that the California Science Project is making satisfactory progress at this point. It enjoys the significant benefit of operating in an environment of Statewide and national consensus about science education reform. For example, its basic model of staff development was advocated in the 1987 report to the Legislature by the

Far West Laboratory and Policy Analysis for California Education (PACE), *Staff Development in California. Public and Personal Investments, Program Patterns, and Policy Choices*. The Project has successfully adapted this model for science education reform, and the model is strongly endorsed by the Project's teacher participants.

Several elements in this model of staff development are crucial to its success and overall effectiveness. They include recruiting teacher-leaders who will maintain a long-term commitment to the program; involving teachers who will be appropriate role models for the students they teach, and creating a learning environment in the institutes that is supportive of peer teaching. These and other elements appear to have had careful attention by the Project staff and Advisory Committee throughout the process of selecting and funding the regional projects.

Yet one element seems to receive somewhat less attention than it deserves: the determination that there is stable, on-going administrative support for the objectives of the Project at the local school site and district levels. The Advisory Committee should not only seek the commitment of the appropriate administrators at the outset of the Project but also continue to monitor the district to determine that this support continues. The multiplier effect that is gained from developing teacher leaders who then teach other teachers can only continue to produce positive results if the school environment is supportive.

As the Commission has observed earlier in this report, some projects made an effort to involve district and school-site administrators in their summer workshops but have found it difficult to secure their participation. These districts should be carefully reviewed to see if they demonstrate the support that is needed to allow the teacher leaders to continue to function as leaders.

Finally, the important connection between instruction and student assessment cannot be too strongly emphasized. As a whole, student assessment should receive greater attention among the Project's nine regional projects, since some project reports virtually ignore the topic. While the enabling legislation for the Project did not identify student assessment as an element of the science education reform with which the Project should be engaged, California's Science Framework and several of the

regional projects -- most notably, the UCLA Science Project -- stress the interdependence of constructivist teaching/learning techniques and "authentic assessment." To put it plainly, the reform in teaching science does not make sense in the absence of the reform in the assessment of students. If there is any area of the California Science Project that might require additional support from the Legislature, it is this area.

## References

American Association for the Advancement of Science. *Science for All Americans*. Washington, D.C. The Association, 1989.

Bay Area Science Project. *Progress Report 1990-1991 and Preliminary Proposal*. Berkeley: Lawrence Hall of Science, December 23, 1991.

California Science Project. *Status Report, January 31, 1992*. Oakland:

California Science Project of Inland Northern California. *Continuation Funding Proposal, February 1992-June 1993*. Chico: California State University, Chico, n.d.

Central Valley Science Project. *Progress Report and Three-Year Plan*. December 23, 1991.

Far West Laboratory and Policy Analysis for California Education (PACE), *Staff Development in California. Public and Personal Investments, Program Patterns, and Policy Choices*. San Francisco: The Laboratory, 1987.

The Inland Area Science Project. *Application for Program Support, California Science Project, 1992-1995*. Riverside: University of California, Riverside, n.d.

National Commission on Excellence in Education. *A Nation at Risk: The Imperative for Educational Reform*. Washington, D.C.: Superintendent of Documents, 1983.

Orange County Education Network (OCSEN). *Final and Interim Report (1990-92), Preliminary Proposal*

(1992-95) Irvine: University of California, December 23, 1991

Sacramento Area Science Project. *Interim Progress Report*. Davis and Sacramento. University of California, Davis, and California State University, Sacramento, December 23, 1991.

St John, Mark. Personal Memorandum

Science Curriculum Framework and Criteria Committee. *Science Framework for California Public Schools Kindergarten Through Grade Twelve* Sacramento. California Department of Education, 1990.

South Coast Science Project. *Progress Report Sub-*

*mitted December 1991 Slightly Revised and Updated, Report on 1991 (Year II)*. Santa Barbara: Mathematics Department, University of California, Santa Barbara, n d

The UCLA Science Project *The UCLA Science Project, April 1990-December 1991*. Los Angeles: University of California, Los Angeles, n.d

USC/LAUSD California Science Project *Progress Report and Refunding Proposal*. Los Angeles: University of Southern California, n d

Weissglass, Julian "Teachers Have Feelings: What Can We Do About It?" Santa Barbara: South Coast Science Project, Mathematics Department, University of California, Santa Barbara.

Senate Bill No. 1601

CHAPTER 1486

An act to add Chapter 13 (commencing with Section 52950) to Part 28 of the Education Code of, the Government Code, relating to science and technology

[Approved by Governor September 30, 1987 Filed with  
Secretary of State September 30, 1987]

LEGISLATIVE COUNSEL'S DIGEST

SB 1601, Garamendi Science and technology school programs and research agenda

Under existing law, there is no statewide science project

This bill would make numerous findings and declarations concerning the need to improve and expand science education in the state It would establish the California Science Project, those provisions of which require a General Fund appropriation to be operative upon an appropriation by the Legislature, to be administered jointly by the University of California, upon approval by the regents, and the Trustees of the California State University in cooperation with the State Department of Education The bill would provide for the appointment of an advisory committee to assist in the implementation of the project, with specified membership and duties The project would encompass approved science projects submitted by and on behalf of public elementary, secondary, and postsecondary schools pursuant to certain criteria, for the training of teachers and the education of students in the state's public schools, as specified

The bill would provide for ongoing evaluation of the project, and would require the California Postsecondary Education Commission to submit various reports concerning the project to the Governor, the Superintendent of Public Instruction, and the Legislature.

*The people of the State of California do enact as follows*

SECTION 1 Chapter 13 (commencing with Section 52950) is added to Part 28 of the Education Code, to read

CHAPTER 13 SCIENCE AND TECHNOLOGY EDUCATION  
IMPROVEMENT PROGRAMS

Article 1 Legislative Findings and Declarations, and Statewide  
Goals

52950 (a) The Legislature finds and declares that improved science education in elementary and secondary schools contributes

to improvements in student performance. The Legislature further finds that the California Writing Project and the California Mathematics Project are exemplary training programs which were established to improve student competence in writing and mathematics through effective in-service education and training programs for teachers in these subject areas. The Legislature recognizes that the California writing and math projects provide effective models which could be utilized in providing staff development for teachers in science.

(b) It is the intent of the Legislature that the Regents of the University of California consider establishing the California Science Project, to be administered jointly by the Regents of the University of California and the Trustees of the California State University in cooperation with the State Department of Education. The purpose of this project shall be to provide in-service education to elementary and secondary teachers in public schools.

It is also the intent of the Legislature that projects be distributed throughout the state so that elementary and secondary school personnel located in rural, urban, and suburban areas may benefit from the in-service education opportunities. It is further the intent of the Legislature that participating school districts, colleges, and universities coordinate these projects with staff development programs and activities currently administered by the State Department of Education, including, but not limited to, teacher education and computer centers established in the same geographic area. It is further the intent of the Legislature that the scientists in the community be contacted in order to determine their interest in participating in the projects.

52951 The Legislature finds and declares as follows:

(a) California is a national and international leader in scientific and technological development. California employs 45 percent of the nation's computer specialists and 21 percent of its engineers. The economic growth of California and the nation will depend in a large part upon its ability to remain competitive with other states and with foreign nations. Maintaining our preeminence will be dependent upon persons who have a solid foundation in science.

(b) There is growing concern about science illiteracy within the state's adult population. A National Science Foundation Report shows that less than half of all high school juniors and one-third of high school seniors take a science course. As a result, American high school students receive only one-half to one-third the exposure to science as their counterparts in other developed countries, such as Japan, West Germany, East Germany, and the Soviet Union.

(c) California has an insufficient number of teachers trained in science and mathematics. There were 1,400 positions filled by teachers not trained in science or mathematics in 1985, and there is a projected shortage of 2,000 to 2,500 positions being filled by teachers not trained in science and mathematics in 1986.

(d) Due to the higher entry level salaries provided by the private sector for college graduates trained in science and mathematics, the growing shortage of qualified science and mathematics teachers will continue

(e) There are exemplary programs in California that upgrade the training of science teachers and train science teachers

(f) Complex problems must be overcome if science education is to advance students to a level of competence appropriate for an increasingly technological society. The decline in science achievement of students in schools, colleges, and universities in California affects all students, but is particularly acute for women students, minority students, and students from lower income groups. The problems related to this situation include, but are not limited to, all of the following:

(1) A lack of understanding of the fundamental principles of science and their implications for everyday life

(2) Inadequate mastery of knowledge of science by students and many teachers, resulting in poor comprehension of college coursework and high attrition rates for those students who have these deficiencies

(3) A tendency among girls and young women to avoid taking science courses in high school, which limits their choice of educational options, and screens them out of future careers in science, engineering, and other science-related professions

(4) Lack of science instruction at the elementary school level to enable all students, including female, minority, and low-income students, to develop skills and attitudes which will enable and encourage them to pursue science successfully in later grades

(5) A critical shortage of qualified teachers, with significant numbers of science teachers leaving the classroom for nonteaching jobs, and few students training to take their places

(6) Lack of teachers' training in the use of laboratory equipment and procedures, as well as the lack of laboratory-based facilities in schools, thereby reducing the opportunity for students to receive "hands-on" science instruction

(7) Staffing of more than 25 percent of science classes by teachers not certified to teach science

(g) While some colleges and universities are improving courses in the teaching of science, this will not fully address the problem, since the number of new teacher candidates is relatively small. Therefore, the Legislature recognizes the need to assist existing teachers in gaining the knowledge necessary to improve science education for all students

(h) The science problem is shared by all segments and levels of California education, and the problem can best be addressed by cooperatively planned and funded efforts

(i) Appropriate models for cooperative, intersegmental approaches to solving the science problem should address the

findings of state and national science associations, including, but not limited to, the National Science Foundation and National Association of Science Teachers. The comprehensive approach will give special attention to providing in-service training of classroom teachers, defining more clearly those standards of science knowledge required at each school level, and developing curricula and instructional strategies to meet these standards. Whenever possible, existing resources shall be pooled to support this comprehensive program. Models for the program may include the California Writing Project, the California Mathematics Project, the EQUALS Project, the MESA Project, the University of California at Irvine's Summer Science Institute, the Lawrence Hall of Science's Programs for Schools, and the Lawrence Livermore Laboratory's Science Education Center, Summer Science Institute, and Lesson In-service Science Workshop for Elementary and Middle School Teachers.

#### Article 2. California Science Project

52955 With funds appropriated therefor, the University of California, upon approval by the regents, shall establish a cooperative endeavor entitled the California Science Project, to be administered jointly with the Trustees of the California State University in cooperation with the State Department of Education. Science projects shall be distributed throughout the state so that public elementary, secondary, and postsecondary school personnel located in rural, urban, and suburban areas may avail themselves of science education. "Project," as used in this chapter, means the California Science Project.

52956 The project shall establish an advisory committee to recommend proposals to be funded and criteria for project evaluation. The advisory committee shall evaluate the progress of the project and recommend appropriate changes.

52957 The advisory committee shall include

- (a) One representative selected by the California Postsecondary Education Commission
- (b) Two representatives selected by the President of the University of California, one of whom has the responsibility for teaching science
- (c) Two representatives selected by the Chancellor of the California State University, one of whom has the responsibility for teaching science
- (d) Two representatives selected by the Chancellor of the California Community Colleges, one of whom has the responsibility for teaching science
- (e) Four public school classroom teachers of science, and one additional representative, selected by the Superintendent of Public Instruction
- (f) One teacher of science plus a representative selected by the

Association of Independent California Colleges and Universities

(g) One representative of business and industry selected by the Industry Education Council of California

(h) One representative of California labor, selected by the California branch of the American Federation of Labor-Congress of Industrial Organizations (AFL-CIO)

(i) One representative of the National Science Supervisors Association.

(j) One representative of a national laboratory, selected by the Regents of the University of California

**52958** The project shall establish criteria for approval of science projects. These criteria shall include, but not be limited to, the extent to which

(a) The science project addresses the need to integrate existing standards of science competence in the curriculum at each school level

(b) The science project establishes clear and informed approaches to the needs of women and minorities for continuing with those science courses required to enhance future career options.

(c) The science project is designed to expand the base of scientific knowledge and the repertoire of teaching techniques of participating teachers and their colleagues in science teaching, and the scientific knowledge of students attending the classes they attend.

(d) Neighboring institutions have worked collaboratively to develop a proposal which clearly indicates their intention to continue to work cooperatively through the duration of the project.

(e) Participating districts, colleges, universities, businesses, federal laboratories, and individual scientists intend to provide financial and personnel support for the science project

(f) Selection of participating teachers will create school-based or district-based teams of leaders for improvement of science education at all grade levels

(g) Participating districts, colleges, universities, and businesses intend to use the expertise of participating teachers for leadership among their teaching colleagues

(h) The science project provides continuing science education to teachers in the public schools

(i) Scientists in both the public and private sector are recruited to enhance the science project by providing facilities or personnel support

**52959** Proposals for science projects which meet the criteria specified in Section 52958 shall be submitted to the advisory committee for review and recommendation. The advisory committee shall establish procedures to assure that individuals reviewing a specific proposal do not submit the proposals for a science project. The Regents of the University of California shall



provide funding to projects which, as a group, provide a comprehensive approach to solving the problems identified in Section 52951

Agencies eligible to submit a proposal for a project shall include, but are not limited to, school districts, county superintendents of schools, colleges, universities, and national laboratories

52960 The policy board of each teacher education and computer center established pursuant to Section 44680.09 shall have the opportunity to review and comment on any initial application submitted by a science project applicant located within the geographic region of the center

52961 The Educational Technology Committee and the State Board of Education shall give careful consideration to funding proposals for classroom application utilizing computers, videos, and other educational technology which would enhance the project

52962 The advisory committee shall develop criteria for evaluating each project. The criteria shall include at least the following elements:

(a) The change in science knowledge and pedagogical techniques for teaching science of participating teachers served by the local project

(b) Participants' attitudes towards the effectiveness of the local project

(c) Changes in classroom behavior and perceived in-class teaching effectiveness

(d) Participants' contribution to ongoing teacher retraining and in-service programs

(e) Any change in the students' knowledge of science due to their teacher's participation in the science project

52963 The California Postsecondary Education Commission shall provide the following information to the Governor, Superintendent of Public Instruction, and the Legislature

(a) A summary of the local project evaluations and an assessment of the extent of program implementation and progress toward achieving project goals. The summary shall be submitted on or before January 1, 1989

(b) An evaluation of the project's effectiveness and recommendations for legislative action regarding the project. The evaluation shall be submitted on or before January 1, 1991

52964 (a) The executive director of the project and the advisory committee shall secure the maximum amount of funding available from the federal government, universities and colleges, school districts, county boards of education, the State Department of Education, and the private sector. The funding may be provided through in-kind contributions

(b) To the extent possible, training provided to teachers shall be eligible for credit through the University of California or the California State University

52965 Articles 2 (commencing with Section 52952) and 3 (commencing with Section 52954) shall not apply to the University of California unless the regents, by resolution, make those provisions applicable

SEC 2 It is the intent of the Legislature that funding for purposes of the California Science Project be provided in the annual Budget Act and the provisions of Article 2 (commencing with Section 52955) of Chapter 13 of Part 28 of the Education Code, which require a General Fund appropriation shall not be operative until the time a future statute appropriates funding for the California Science Project

# CALIFORNIA POSTSECONDARY EDUCATION COMMISSION

THE California Postsecondary Education Commission is a citizen board established in 1974 by the Legislature and Governor to coordinate the efforts of California's colleges and universities and to provide independent, non-partisan policy analysis and recommendations to the Governor and Legislature

## Members of the Commission

The Commission consists of 17 members. Nine represent the general public, with three each appointed for six-year terms by the Governor, the Senate Rules Committee, and the Speaker of the Assembly. Six others represent the major segments of postsecondary education in California. Two student members are appointed by the Governor.

As of September 1993, the Commissioners representing the general public are

Henry Der, San Francisco, *Chair*  
C. Thomas Dean, Long Beach, *Vice Chair*  
Mim Andelson, Los Angeles  
Helen Z. Hansen, Long Beach  
Lowell J. Paige, El Macero  
Guillermo Rodriguez, Jr., San Francisco  
Stephen P. Teale, M.D., Modesto  
Mehinda G. Wilson, Torrance  
Linda J. Wong, Los Angeles

Representatives of the segments are

Alice J. Gonzales, Rocklin, appointed by the Regents of the University of California,  
Yvonne W. Larsen, San Diego, appointed by the California State Board of Education,  
Timothy P. Haudinger, Rancho Santa Fe, appointed by the Board of Governors of the California Community Colleges,  
Ted J. Saenger, San Francisco, appointed by the Trustees of the California State University,  
Kyhl M. Smeby, Pasadena, appointed by the Governor to represent California's independent colleges and universities, and  
Harry Wugalter, Ventura, appointed by the Council for Private Postsecondary and Vocational Education

The student representatives are

Christopher A. Lowe, Placentia  
Beverly A. Sandeen, Costa Mesa

## Functions of the Commission

The Commission is charged by the Legislature and Governor to "assure the effective utilization of public postsecondary education resources, thereby eliminating waste and unnecessary duplication, and to promote diversity, innovation, and responsiveness to student and societal needs."

To this end, the Commission conducts independent reviews of matters affecting the 2,600 institutions of postsecondary education in California, including community colleges, four-year colleges, universities, and professional and occupational schools.

As an advisory body to the Legislature and Governor, the Commission does not govern or administer any institutions, nor does it approve, authorize, or accredit any of them. Instead, it performs its specific duties of planning, evaluation, and coordination by cooperating with other State agencies and non-governmental groups that perform those other governing, administrative, and assessment functions.

## Operation of the Commission

The Commission holds regular meetings throughout the year at which it debates and takes action on staff studies and takes positions on proposed legislation affecting education beyond the high school in California. By law, its meetings are open to the public. Requests to speak at a meeting may be made by writing the Commission in advance or by submitting a request before the start of the meeting.

The Commission's day-to-day work is carried out by its staff in Sacramento, under the guidance of its executive director, Warren Halsey Fox, Ph.D., who is appointed by the Commission.

Further information about the Commission and its publications may be obtained from the Commission offices at 1303 J Street, Suite 500, Sacramento, California 95814-2938, telephone (916) 445-7933.

# PROGRESS OF THE CALIFORNIA SCIENCE PROJECT

## California Postsecondary Education Commission Report 92-15

ONE of a series of reports published by the Commission as part of its planning and coordinating responsibilities. Additional copies may be obtained without charge from the Publications Office, California Postsecondary Education Commission, Third Floor, 1020 Twelfth Street, Sacramento, California 95814-3985.

Recent reports of the Commission include

**91-16** Update on Long-Range Planning Activities: Report of the Executive Director, September 16, 1991 (September 1991)

**91-17** The Role, Structure, and Operation of the Commission: A Preliminary Response to Senate Bill 2374 (October 1991)

**91-18** 1991-92 Plan of Work for the California Postsecondary Education Commission: Major Studies and Other Commission Activities (October 1991)

**91-19** Reauthorization of the Higher Education Act of 1965 as Amended: A Report to California's Congressional Delegation Summarizing Consensus in California's Higher Education Community Regarding Proposed Revisions of the Act (December 1991)

**91-20** Student Fees, Access, and Quality: Prospects and Issues for the 1992-93 Budget Process (December 1991)

**91-21** Legislative and State Budget Priorities of the Commission, 1992: A Report of the California Postsecondary Education Commission (December 1991)

**91-22** Proposed Construction of the Western Nevada County Center, Sierra Joint Community College District: A Report to the Governor and Legislature in Response to a Request for Capital Funds for a Permanent Off-Campus Center in the Grass Valley/Nevada City Area (December 1991)

**92-1** Final Report on the Effectiveness of Intersegmental Student Preparation Programs: The Third Report to the Legislature in Response to Item 6420-0011-001 of the 1988-89 Budget Act (January 1992)

**92-2** Assessing Campus Climate: Feasibility of Developing an Educational Equity Assessment System (January 1992)

**92-3** California's Joint Doctoral Programs. A Report on Doctoral Programs Offered by Campuses of the California State University with Campuses of the University of California and the Claremont Graduate School (January 1992)

**92-4** Prospects for Long-Range Capital Planning in

California Public Higher Education: A Preliminary Review A Staff Report to the California Postsecondary Education Commission (January 1992)

**92-5** Current Methods and Future Prospects for Funding California Public Higher Education The First in a Series of Reports on Funding California's Colleges and Universities into the Twenty-First Century (March 1992)

**92-6** Commission Comments on the Systems' Preliminary Funding Gap Reports: A Report to the Legislature and the Governor in Response to Supplemental Report Language of the 1991 Budget Act (March 1992)

**92-7** Analyses of Options and Alternatives for California Higher Education: Comments by the Staff of the California Postsecondary Education Commission on Current Proposals for Change in California's Public Colleges and Universities (March 1992)

**92-8** Faculty Salaries in California's Public Universities, 1992-93. A Report to the Legislature and Governor in Response to Senate Concurrent Resolution No 51 (1965) (March 1992)

**92-9** Fiscal Profiles, 1992. The Second in a Series of Handbooks about the Financing of California Postsecondary Education (March 1992)

**92-10** Student Profiles, 1991 The Second in a Series of Annual Factbooks About Student Participation in California Higher Education (March 1992)

**92-11** Meeting the Educational Needs of the New Californians A Report to Governor Wilson and the California Legislature in Response to Assembly Concurrent Resolution 128 (1990) (March 1992)

**92-12** Analysis of the 1992-93 Governor's Budget: A Staff Report to the California Postsecondary Education Commission (March 1992)

**92-13** Postsecondary Enrollment Opportunities for High School Students A Report to the Legislature and the Governor in Response to Chapter 554, Statutes of 1990 (June 1992)

**92-14** Eligibility of California's 1990 High School Graduates for Admission to the State's Public Universities: A Report of the 1990 High School Eligibility Study (June 1992)

**92-15** Progress of the California Science Project: A Report to the Legislature in Response to Chapter 1486, Statutes of 1987 (June 1992)